



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/727,900

12/05/2003

Seong Jin Kim

123034-05004744

9568

22429

7590

02/12/2008

LOWE HAUPTMAN HAM & BERNER, LLP
1700 DIAGONAL ROAD
SUITE 300
ALEXANDRIA, VA 22314

EXAMINER

HEINRICH, SAMUEL M

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

02/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/727,900	Applicant(s) KIM ET AL.	
	Examiner Samuel M. Heinrich	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7,9-13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,9-13 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US20030040173A1 to Fonash et al in view of US20030180627 to Lavallee et al.

Fonash et al teach a method for manufacturing a device which comprises forming a lower electrode (14) on a substrate; forming a sacrificial layer pattern on the substrate including the lower electrode (16); forming an upper electrode (16); forming an upper electrode on the substrate including the sacrificial layer pattern (18); removing the sacrificial layer so that a nano gap (20) is formed between the lower electrode and the upper electrode; and adsorbing conductive organic molecules (21) between the upper electrode and the lower electrode in the nano gap. (See Figure 1; sections 0012, 0015, 0035 and 0048). Fonash et al describe well

Art Unit: 1793

known scribing, machining, embossing, ablation, and lithography. Fonash et al do not describe forming a polymer pattern with the particular line width of 50 nm. Fonash et al show (e.g., Figure 3) a smaller upper electrode and a larger lower electrode which comprise an asymmetric nanogap between the upper and lower electrodes. Fonash et al describe [0055] Au electrode material.

Lavallee et al describe [0049] use of an electron beam for producing lines “as small as 50 nm”. This size limitation would have been obvious at the time applicant’s invention was made to a person having ordinary skill in the art because the size is suitable for the manufacture of a molecular scale device.

Claims 9-11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US20030040173A1 to Fonash et al in view of US20030180627 to Lavallee et al as applied to claim 7 above, and further in view of USPN 5,497,000 to Tao et al.

Tao et al describe (column 2, line 60 through column 3, line 18) molecules to be deposited and are in solution are adsorbed onto the surface of the conducting substrate. The use of solution would have been obvious at the time applicant’s invention was made to a person having ordinary skill in the art in order to suitably deposit molecules on the substrate.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over US20030040173A1 to Fonash et al in view of US20030180627 to Lavallee et al in view of USPN 5,497,000 to Tao et al as applied to claim 9 above, and further in view of US20020134426A1 to Chiba et al.

Chiba et al describe [0048] material adsorption with use of a heated solution and the use of a heated solution in Tao et al would have been obvious at the time applicant's invention was made to a person having ordinary skill in the art to suitably deposit molecules on the substrate.

Claims 12, 13, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US20030040173A1 to Fonash et al in view of US20030180627 to Lavallee et al as applied to claim 7 above, and further in view of USPN 6,770,190 to Milanovski et al.

Milanovski et al describe (column 8, lines 25-50) well known monitoring of the electric potential and the use thereof in Fonash et al would have been obvious at the time applicant's invention was made to a person having ordinary skill in the art because it provides absorption control.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over US20030040173A1 to Fonash et al in view of US20030180627 to Lavallee et al as applied to claim 7 above, and further in view of Applicant's Admitted Prior Art (AAPA).

AAPA (Specification, Description of the Related Art) describes Applied Physics Letters, Vol. 82-10, which comprises a sacrificial platinum layer. The use of this well known material would have been obvious at the time applicant's invention was made to a person having ordinary skill in the art because it's a well known conductor material.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over US20030040173A1 to Fonash et al in view of US20030180627 to Lavallee et al as applied to claim 9 above, and further in view of Applicant's Admitted Prior Art (AAPA).

AAPA (Specification, Description of the Related Art) describes Applied Physics Letters, Vol. 82-10, which comprises a sacrificial platinum layer. The use of this well known material

would have been obvious at the time applicant's invention was made to a person having ordinary skill in the art because it's a well known conductor material.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US20030040173A1 to Fonash et al in view of US20030180627 to Lavallee et al as applied to claim 12 above, and further in view of Applicant's Admitted Prior Art (AAPA).

AAPA (Specification, Description of the Related Art) describes Applied Physics Letters, Vol. 82-10, which comprises a sacrificial platinum layer. The use of this well known material would have been obvious at the time applicant's invention was made to a person having ordinary skill in the art because it's a well known conductor material.

Response to Arguments

Applicant's arguments filed December 11, 2007 have been fully considered but they are not persuasive.

Applicant argues forming an asymmetric nanogap. This argument is not convincing. Fonash et al show (e.g., Figure 3) a smaller upper electrode and a larger lower electrode which comprise an asymmetric nanogap between the upper and lower electrodes.

In response to applicant's arguments against Lavallee et al, Tao et al, and Milanovski et al, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fritzsche et al disclose an asymmetric nanogap.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel M. Heinrich whose telephone number is 571-272-1175. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Samuel M Heinrich
Primary Examiner
Art Unit 1793

/Samuel M Heinrich/
Primary Examiner, Art Unit 1793